



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, Washington 98101

January 4, 2002

Reply To
Attn Of:ECL-113

Commander, Ft. Lewis
Directorate of Public Works
ATTN: AFZH-DEQ MS 17 (Mr. Eric Waehling)
Building 2012, Room 323
Ft. Lewis, WA 98433-9500

(sent via e-mail and regular mail)

Subject: *Expanded Site Inspection Landfill 4 Demolition Area 1, Camp Bonneville, Washington, prepared by URS, for the US Army Corp of Engineers, and dated November 2001*

Dear Mr. Waehling:

Thank you for the opportunity to review the subject report. Please find EPA's comments enclosed. Please contact me at (206) 553-1220 or at sheldrake.sean@epa.gov with any questions or concerns.

Sincerely,

Sean Sheldrake, Project Manager

cc: Mike Nelson, USACE
Christopher Maurer, WDOE

(Via email only)

""

INTRODUCTION

At the request of EPA, Gannett Fleming, Incorporated (Gannett Fleming) reviewed the *Expanded Site Inspection Landfill 4 Demolition Area 1, Camp Bonneville, Washington*, prepared by URS, for the US Army Corp of Engineers, and dated November 2001.

The Camp Bonneville Landfill 4 Expanded Site Inspection report documents the groundwater investigation conducted by USACE. The workplan for this investigation was reviewed by Gannett Fleming and EPA and technical comment provided. In subsequent meetings with USACE a number of EPA comments were not resolved, however, and the USACE initiated the study without EPA concurrence. Two of the issues raised by EPA and Gannett Fleming in their review of the workplan for this project were the insufficient number of monitoring wells proposed and the fact that the proposed plan did not address the extent of groundwater contamination associated with Landfill 4.

GENERAL COMMENTS

- 1. The extent of contamination at the landfill has been discussed in past meetings with USACE as an issue of key importance to EPA. The current site conceptual model developed for Landfill 4 and presented in this report, however, does not determine the direction of groundwater flow in the weathered bedrock or the distance that contaminant plumes have migrated from Landfill 4. Identification of potential pathways and receptors for the site conceptual model cannot be conclusively drawn without a better understanding of the extent and direction of groundwater contamination. (JR)**

Groundwater quality and Landfill 4 hydrogeology were the primary focus of this ESI investigation which provides data on contaminant concentrations present in groundwater but does not provide determination of extent of contamination. The analysis of groundwater samples collected during this investigation indicate the presence of contaminants in groundwater in the vicinity of Landfill 4 associated with explosives, propellants and solvents. (JR)

- 2. In the Executive Summary section in the text states, "Surface water used by on-site and off-site receptors is a potentially complete pathway for future on-site recreational users and future on-site workers. However, because of the distance from Landfill 4 to where Lacamas Creek exits Camp Bonneville, exposure to off-site recreational users, off-site residents,**

however, the relatively unweathered nature of the fragments suggests that groundwater flows in the past have not been significant.” Please include additional information to provide more justify this statement.

For instance, does the “weathered bedrock surface” refer only to the surface or the entire thickness of this zone? Groundwater movement will not be limited to the surface but would extend through the weathered basalt zone. In addition, “appears capable” does not indicate the criteria evaluated in reaching this conclusion. Based on the performance of the wells installed and sampled as part of this investigation, however, the weathered basalt does in fact produce groundwater (approximately 0.73 gpm estimated from the well development data sheet for MW02B).

Finally, the initial round of sampling detected contaminants in MW02B that are most likely attributable to the landfill within the weathered basalt. The extent and direction(s) of movement of the contaminant plume however remain undetermined. (JR)

2. Executive Summary, page ES-2, Third and Fourth Paragraph. This portion of the text states that there are “...insufficient data to calculate a hydraulic conductivity and groundwater velocity in the weathered bedrock at this time.” Based on relatively low estimates of groundwater velocity observed for the unconsolidated sediments, it would appear that hydraulic conductivity and velocity data should also be measured in the weathered bedrock. These data could provide insight to the potential extent of contaminant migration.

The text should include discussion of why testing to estimate aquifer characteristics in the weathered basalt and unconsolidated sedimentary interface was not conducted while the formation was open during the drilling operation. Additionally, any testing that could be performed or is planned on the current well installations to evaluate the variation in aquifer characteristics and groundwater quality as a result of seasonal fluctuation in recharge should be included.

The text states that the “Shallow groundwater in the area of Landfill 4 historically has not been considered a viable and potable water source....” and later that “definitive information on aquifer yield would be needed to evaluate whether a minimum of 0.5 gallons could be maintained.” The text should refrain from including historic assumption and report current interpretation of site conditions supported with data such as measurements of aquifer yield in specific wells, formations and

and off-site workers to contaminants of potential concern (COPCs) in surface water is considered to be potentially complete, but negligible in importance.” How can this pathway be evaluated when the extent of groundwater and surface water contamination has not yet been determined? Please explain. (AP)

The Executive Summary also states “The ingestion pathway for the consumption of fish affected by site contaminants is considered potentially complete but negligible because the contaminants detected in the groundwater at Landfill 4 do not appreciably bioaccumulate in fish.” This comparison of groundwater concentrations to indicate risk to fish and human health is incorrect. Risk to fish and human health should be determined based on surface water samples, which should be located in agreed upon areas of Lacamas Creek by the agencies, and then compared to surface water criteria. Please refrain from making such statements before the pathways and extent of contamination has been determined. (AP)

3. The text also indicates that there is documented soil contamination at and around the Landfill 4 location, if the surface water pathway is being evaluated it should also include overland flow and the drainage area of the landfill in relation to Lacamas Creek. (AP)
4. As mentioned during the June 11, 2001 review of the project QAPP by Gannett Fleming, the method and quality control criteria for analysis of Nitroguanidine is not provided in any project documentation. Please see previous comments generated through review of the QAPP for section 5.1, Page 5-1 and for Table 4-14. Without providing the method nor the quality control procedures that was used for this analysis, the data provided should be rejected. (AP)
5. As mentioned during the June 11, 2001 review of the project QAPP, laboratory and sampling SOP’s are referenced, however, SOP’s and specific QC criteria are not provided in any project documentation. Without information such as criteria for method blanks, specification of analytical methods used, and criteria for laboratory performance, data generated during this project cannot be validated. (AP)

SPECIFIC COMMENTS

1. Executive Summary, Page ES-1, Third Paragraph. The text states that “The weathered bedrock surface appears capable of transmitting groundwater;

contaminant concentrations. (JR)

3. **Section 3.1, Page 3-1, Fifth Paragraph. Please include the definition of the acronym JATO that was detonated at Landfill 4. (JR)**
4. **Section 3.3.1, Page 3-3, Second Paragraph. The text states that “The area surrounding Camp Bonneville is sparsely populated with scattered residences and is used primarily for agriculture and livestock grazing.” This description does not include any mention the housing developments that are increasingly being built downgradient of the Camp Bonneville area in response to population growth and development in eastern Clark County. The text should mention the rising presence of residential development in the area around Camp Bonneville and that shallow and deep aquifers are the primary source of potable water. (JR)**
5. **Geologic Cross Section A-A, Figure 5-2. This figure indicates the depth of the screened zone in well L4 MW02B as 25 to 30 feet deeper than Lacamas Creek. The figure shows elevations estimated based on limited data but if the weathered basalt layer contains contaminants as the analytical results for Monitoring Well MW02B indicate the weathered basalt may transmit them to or below Lacamas Creek.**

Previous surface water sampling in the creek was reported to have been conducted upgradient, at and downgradient of the landfill. If the weathered bedrock is below the streambed however, than a more appropriate area at which to assess impact of Landfill 4 to Lacamas Creek could be further downstream where the stream bed exposes the weathered bedrock.

The Conceptual Site Model as shown in Figure 6-1, however, does not include a complete pathway to potential receptors through the groundwater to surface water pathways. The text should discuss the potential for impact to surface water other than by seeps on the slope of the landfill to assure the validity of the model. (JR)

6. **Section 4.3.2, Page 4-3, Third Paragraph. This section of the text states that “...cuttings from the weathered zone appeared greatly fragmented...”and that “..”coring of the weathered bedrock was not performed.” Later, however, in Section 4.5.2, the text includes the statement that “...the action of the air rotary bit on the weathered bedrock caused fragmentation of the weathered bedrock; therefore, coring was not attempted in the weathered bedrock.”**

As coring is not usually done with the air rotary drilling assembly down hole it is not clear why the drilling results with the down hole hammer are mentioned as precluding coring of the weathered bedrock. The author should include a discussion of the potential for coring the weathered bedrock in order to recover a sample that is more representative of the weathered bedrock structure and porosity. (JR)

- 7. Section 4.3.3, Page 4-4, Second Paragraph. According to the this section of the text the deeper wells were installed “...in the weathered bedrock or competent bedrock.” Figure 5-2, however, shows all the screened sections of the deeper wells were placed in the weathered bedrock. Please amend the text to state this. (JR)**
- 8. Section 4.6.1, Page 4-8, Second Paragraph. The text include the statement that “The measurement was recorded in the field logbook and on the groundwater sampling form to a precision of 0.01 foot.” In an earlier section the text, as well as in Section 4.8 of the text the well surveying is discussed and there is no mention of vertical resolution obtained for the well measuring points. The precision of water levels measured at the well head results from the accuracy of the actual measurement of the height of the water and includes the accuracy of the surveyed measuring point elevations. Accuracy of the measuring point survey data should be included in one of these sections. (JR)**
- 9. Section 5.1.1, Page 5-1, Third Paragraph. This section of the report describes the search for seeps downgradient of the landfill. In the opinion of Gannett Fleming, late summer may not be the opportune time to be looking for seeps especially in a year typified by drought conditions in the Pacific Northwest. Please discuss any plans to conduct this search again during the time of year more likely to result in seeps on the slope below the landfill. (JR)**
- 10. Section 5.1.4, Page 5-4, Last Paragraph. Please discuss the potential to performing the same tests on the wells in the weathered basalt to estimate of hydraulic conductivity that were performed for the wells constructed in the shallow unconsolidated sediments. Evaluation of all distinct zones of potential contaminant migration should be performed to provide at least a relative evaluation of the hydraulic characteristics for individual lithologic units. (JR)**
- 11. Section 6.1, Page 6-2, Third paragraph. The text states that ”...fractures in the samples were filled with zeolite mineralization or calcite.” Calcite**

mineral deposits can be the result of secondary mineralization indicating groundwater movement through the formation. The text should state the implication of calcite as a result of secondary mineralization as an indication of groundwater movement. (JR)

12. **Section 6.2, Page 6-4, Third Paragraph.** The discussion of the potential pathway from Landfill 4 and potential receptors is considered a potential but due to the distance incomplete. Many of the contaminants associated with munitions, such as RDX, are toxic at low concentrations and persistent in the environment. The assumption that the three mile distance precludes off site release of contaminants, should be substantiated.

The text references surface water sampling conducted by Hart Crowser as support for this assumption. In the opinion of Gannett Fleming, additional data on the extent of groundwater contamination and potential groundwater to surface water pathway is required to support these assumptions. The previous surface water sampling locations may not be sufficiently downgradient of the landfill (far enough down stream from the landfill) and should include sediment samples. (JR)

13. **Section 2.0, Page 2-1 Paragraph 1.** This section states that “The ESI was selected as the appropriate pre-remedial CERCLA phase in which to obtain additional data for the site.” This section does not indicate if the Region 10 EPA, Washington State Department of Ecology, and the BRAC Cleanup Team were all in agreement on this pre-remedial activity and how the activities were carried out. Please specify if these agencies were in agreement. (AP)
14. **Section 4.9.2., Page 4-13.** This section states that “The laboratories were provided method-specific QC criteria (including frequency, QC limits, and corrective actions) 2 weeks prior to the start of the sampling activity.” It is unknown to the reader what modifications to the EPA SW-846 methods the project laboratories were provided. Please provide the specific QC criteria which was sent to the laboratories. (AP)
15. **Table 4-5, Comparison of Laboratory Method Detection and Practical Quantitation Limits and Applicable Screening Values for Groundwater.** This table identifies many analytes which were detected at Landfill 4, however, the laboratory reporting limit exceeds the screening value for one or more values. Therefore, many analytes may be present in groundwater at Landfill 4 above screening levels, but were not detected due to the laboratories high detection limits. This comment was also made during the June 11,

2001 review of this project's QAPP, in Section 2.4, Page 2-2 of the QAPP. Samples should have been analyzed with low-detection methods, and should be qualified as suspect or estimated data. (AP)

16. Section 5.3, Page 5-9. This section states "An emphasis was placed on the most important COPCs and the PE analytes including all explosives residues and propellants..." What does this statement mean? What level of data validation was done and was the data validation completed for all analyses? (AP)
17. Section 5.4.3., Page 5-10. This section states that "The % RSD for several compounds was above the specified limits of <15 percent; however, of these compounds, only two (methylene chloride and dichlorodifluoromethane) were detected in samples." The section then states that the two compounds were J flagged as estimated. Please explain why these samples were not re-analyzed with a new calibration and or with a new continuing calibration? (AP)

APPENDIX A

1. Appendix A, Page A-1, First Paragraph. Please clarify the last sentence of this paragraph which states that "UXO avoidance was completed at three soil boring locations using a backhoe and a down hole magnetometer to a depth of 8-10 feet bgs." Please include additional information on how each excavation lift was screened laterally over the entire exposed surface using a down hole magnetometer having a distance sensitivity of 2 feet or less.

In addition, the text should state how any contaminated soils and debris were stored and disposed of and include the type of soils used for backfilling the excavation pits. Also, please provide details of how soil samples were collected and how the excavated areas were abandoned so that the disturbed soils in the pit areas would not increase infiltration of precipitation and the potential mobilization of contaminants present in the soils. (JR)

2. Appendix A, Page A-1, Second Paragraph. The text states that according to the workplan "...the main 10-inch casing would be advanced at least three feet into the weathered bedrock zone and filled with bentonite..." and that this would "...seal off the shallow water bearing zone." In this section of the report, however, the text states that "...a seal should be placed...prior to advancing ...into the weathered bedrock." According to the text, however the ".....seal was placed at the bottom of the 10-inch casing prior

to advancing....”.

If the casing and grout seal between the upper unconsolidated materials and the deeper lithologic unit does not actually penetrate the lower unit, how can the segregation of the two units be assured, in particular should artesian pressure develop in the lower unit during the rainy winter months? Please include a reference from WAC 173-160 Minimum Standard for Construction and Maintenance of Wells that indicates that this casing and sealing configuration is acceptable for resource Protection Wells in the State of Washington as opposed to sealing the casing within each deeper formation. (JR)

- 3. Appendix A, Page A-2, First Paragraph. This portion of the text states that “Some of the wells may have appreciable amounts of stagnant water in the water column that was sampled.”**

If the wells were slow to recharge, as the text states, and were bailed or pumped dry, then the groundwater sample could have been collected as, or immediately after, the wells recovered. The well would then provide fresh formation water and avoid “stagnant” water being collected and jeopardizing the quality of the analytical results for VOCs in particular. (JR)

